

CLAIMS

What is claimed is:

- 1 1. An electronic package having selectively controlled contact pad - laminate surface
2 adhesion comprising:
3 a dielectric substrate having a major surface;
4 a conductive foil laminated to said major surface wherein said foil has at least one
5 side having a smooth portion thereof, and wherein said smooth portion contacts said
6 major surface of said dielectric substrate.
- 1 2. An electronic package having selectively controlled contact pad - laminate surface
2 adhesion, according to claim 1, wherein said conductive foil comprises any conductive
3 material selected from the group consisting of copper, aluminum, gold, silver, nickel, and
4 chrome.
- 1 3. An electronic package having selectively controlled contact pad - laminate surface
2 adhesion, according to claim 1, wherein said conductive foil comprises any material
3 having high electrical conductivity.
- 1 4. A method of fabricating an electronic package having selectively controlled contact
2 pad - laminate surface adhesion comprising:
3 providing a dielectric substrate having a major surface;
4 providing a conductive foil wherein said foil has at least one side having a smooth
5 portion thereof;
6 laminating said conductive foil to said major surface wherein said smooth portion
7 contacts said major surface;
8 applying a negative acting resist to said conductive foil;
9 developing said resist forming openings;
10 etching exposed conductive foil, wherein said etching forms a connection pad.

1 5. A method of fabricating an electronic package having selectively controlled contact
2 pad - laminate surface adhesion, according to claim 2, wherein said conductive foil
3 comprises any conductive material selected from the group consisting of copper, aluminum,
4 gold, silver, nickel, and chrome.

1 6. A method of fabricating an electronic package having selectively controlled contact
2 pad - laminate surface adhesion, according to claim 2, wherein said conductive foil
3 comprises any material having high electrical conductivity.

1 7. A method of fabricating an electronic package having selectively controlled contact
2 pad - laminate surface adhesion, according to claim 2, wherein said smooth portion has a
3 surface roughness less than about 1.0 micron.

1 8. A method of fabricating an electronic package having selectively controlled contact
2 pad - laminate surface adhesion, according to claim 2, wherein said smooth side has a
3 surface roughness about 0.01 micron.

1 9. An electronic package having selectively controlled contact pad - laminate surface
2 adhesion, fabricated by the method of claim 2.

1 10. An electronic package having selectively controlled contact pad - laminate surface
2 adhesion comprising:
3 a dielectric substrate having a major surface;
4 a conductive foil laminated to said major surface wherein said foil has a smooth side
5 and a dendritic side, and wherein said dendritic side contacts said major surface of said
6 dielectric substrate.

- 1 11. A method of fabricating an electronic package having selectively controlled contact
2 pad - laminate surface adhesion comprising:
3 providing a dielectric substrate having a major surface;
4 providing conductive foil having a least one dendritic side;
5 laminating said conductive foil to said major surface wherein said at least one
6 dendritic side contacts and imparts a dendritic topology to said major surface;
7 Masking said conductive foil;
8 exposing said dendritic topology by etching said conductive foil;
9 smoothing said dendritic topology;
10 applying a first metallization layer to said major surface; and
11 plating at least a second metallization layer on said first metallization layer.
- 1 12. A method of fabricating an electronic package having selectively controlled contact
2 pad - laminate surface adhesion, according to claim 11, wherein said first metallization layer
3 is a catalyst seed layer.
- 1 13. A method of fabricating an electronic package having selectively controlled contact
2 pad - laminate surface adhesion, according to claim 11, wherein said first metallization layer
3 comprises a catalyst selected from the group consisting of palladium, palladium / tin, and
4 other similar catalysts.
- 1 14. A method of fabricating an electronic package having selectively controlled contact
2 pad - laminate surface adhesion, according to claim 11, wherein said first metallization layer
3 comprises a thin sputter or electrodeposited metal layer.
- 1 15. A method of fabricating an electronic package having selectively controlled contact
2 pad - laminate surface adhesion, according to claim 11, wherein smoothing said dendritic
3 topology comprises techniques selected from the group consisting of plasma, vapor,
4 chemical, and mechanical attack.

- 1 16. A method of fabricating an electronic package having selectively controlled contact
2 pad - laminate surface adhesion fabricated by the method of claim 11.

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- 1 17. A springboard contact pad - laminate surface contact structure comprising:
2 a semiconductor substrate having a major surface;
3 a first mechanically compliant dielectric layer formed over said major surface of said
4 substrate and having at least one first opening formed therethrough;
5 a first electrical contact pad formed in said first opening and in electrical contact
6 with said substrate;
7 a second mechanically compliant dielectric layer formed over said first compliant
8 layer and having at least one second opening formed therethrough wherein said second
9 opening is substantially offset from said first opening;
10 a second electrical contact pad formed in said second opening and in electrical
11 contact with said first electrical contact pad;
12 a mask layer formed over said second compliant layer and having a third opening
13 therethrough in communication with said second electrical contact pad; and
14 a solder ball solderably connected to said second electrical contact pad and
15 extending through said third opening.

- 1 18. A springboard contact pad - laminate surface contact structure, according to claim
2 17, wherein said mask layer is a soldermask.

- 1 19. A springboard contact pad - laminate surface contact structure, according to claim
2 17, wherein said mechanically compliant layers comprises dielectric materials selected from
3 the group consisting of photoresist, photoimageable dielectrics and prepreg.

1 20. A springboard contact pad - laminate surface contact structure, according to claim
2 17, wherein said electrical contact pads comprise highly conductive material selected from
3 the group consisting of copper, copper foil, plated copper foil, and other suitable materials.

1 21. A springboard contact pad - laminate surface contact structure, according to claim
2 17, wherein said electrical contact pads comprise highly conductive material selected from
3 the group consisting of aluminum, gold, silver, nickel, and chrome.

1 ~~22~~ A method of fabricating a springboard contact pad - laminate surface contact
2 structure comprising the steps of:
3 providing a semiconductor substrate having a major surface;
4 forming a first electrical contact pad on said major surface of said semiconductor
5 substrate;
6 forming a first mechanically compliant dielectric layer over said major surface of
7 said substrate wherein the upper surface of said first dielectric layer is coplanar with the
8 upper surface of said first electrical contact pad and wherein said upper surface of said first
9 electrical contact pad is exposed through said first dielectric layer;
10 forming a second mechanically compliant dielectric layer over said first dielectric
11 layer and having at least one opening formed therethrough wherein said opening is
12 substantially offset from said first electrical contact pad and wherein said second opening
13 exposes a target surface;
14 forming a second electrical contact pad on said target surface;
15 forming a mask layer over said second dielectric layer wherein said mask has an
16 opening through to said second electrical pad; and
17 soldering a solder ball to said second electrical pad wherein said solder ball extends
18 through said third opening.

23. A method of fabricating a springboard contact pad - laminate surface contact structure, according to claim 22, wherein forming said first electrical contact pad comprises the steps of:

- laminating said semiconductor substrate with metallic foil; optionally,
- plating said foil with a second metallization; and
- appropriately masking and etching said second metallization and said foil through to said substrate.

1 24. A method of fabricating a springboard contact pad - laminate surface contact
2 structure, according to claim 22, wherein said foil comprises copper.

1 25. A method of fabricating a springboard contact pad - laminate surface contact
2 structure, according to claim 22, wherein said second metallization comprises copper
3 plating.

1 26. A method of fabricating a springboard contact pad - laminate surface contact
2 structure, according to claim 22, wherein said first and said second mechanically compliant
3 layers comprise dielectric materials selected from the group consisting of photoresist,
4 photoimageable dielectrics and prepreg.

1 27. A method of fabricating a springboard contact pad - laminate surface contact
2 structure, according to claim 22, wherein said target surface comprises an edge portion of
3 the upper surface of said first electrical contact pad and a portion of the upper surface of said
4 first compliant layer.

1 28. A method of fabricating a springboard contact pad - laminate surface contact
2 structure, according to claim 22, wherein forming said second electrical contact pad
3 comprises the steps of:
4 providing the target surface with a catalyst seed layer; and

5 plating a second metallization over said seed layer.

1 29. A method of fabricating a springboard contact pad - laminate surface contact
2 structure, according to claim 22, wherein said catalyst seed layer comprises a catalyst
3 selected from the group consisting of palladium, palladium/tin, and other similar catalysts.

1 30. A method of fabricating a springboard contact pad - laminate surface contact
2 structure, according to claim 22, wherein said second metallization comprises copper.

1 31. A method of fabricating a springboard contact pad - laminate surface contact
2 structure, according to claim 22, wherein said second metallization comprises any
3 conductive material selected from the group consisting of copper, aluminum, gold, silver,
4 nickel, and chrome.

1 32. A method of fabricating a springboard contact pad - laminate surface contact
2 structure, according to claim 22, wherein forming said second electrical contact pad
3 comprises the steps of:
4 forming a layer of conductive paste on the upper surface of said first electrical
5 contact pad and on the upper surface of said first compliant layer;
6 laminating an upper layer of metallic foil over said paste layer wherein said metallic
7 foil mechanically bonds with said first electrical contact pad;
8 masking and etching said upper metallic layer leaving a second electrical contact pad
9 in electrical contact with and substantially offset from said first electrical contact pad.

1 33. A method of fabricating a springboard contact pad - laminate surface contact
2 structure, according to claim 22, wherein forming said second electrical contact pad
3 comprises the steps of:
4 plating a layer a layer of wirebondable gold on the upper surface of said first
5 electrical contact pad;

6 laminating an upper layer of copper foil over said gold layer;
7 masking and etching said upper copper layer leaving a second electrical contact pad
8 in electrical contact with and substantially offset from said first electrical contact pad.

1 34. A springboard contact pad - laminate surface contact structure fabricated according
2 to the method of claim 13.

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